

2. Notes on the Genera of Turtles (*Oiacopodes*), and especially on their Skeletons and Skulls. By Dr. J. E. GRAY, F.R.S. &c.

[Received February 19, 1873.]

The number of species of Turtles is very limited, which is the case with the other sea animals that inhabit the warm or subtropical regions of the ocean. The Turtles, like the Sperm-Whale, have an extended geographical distribution, because many specimens wander or are carried away by currents from their natural habitats, and are often found as stragglers far away from the place which they properly inhabit. Thus the Luth (*Sphargis*) has been observed in the Mediterranean, and on the coast of Dorsetshire and Yorkshire, at New Zealand, Australia, and on the coast of Japan; but I have no authority for believing that it breeds in any of these places. The Loggerhead (*Caouana*), the imbricate Turtle (*Caretta*), and the Turtle (*Chelonia*) have also been found, under similar circumstances, at a considerable distance to the north or south of the tropics.

The species have been very imperfectly studied; and several are named in different works that are very insufficiently characterized, and for this reason difficult to recognize as distinct. Four kinds are recognized by sailors and the world in general; and each of these kinds has such a distinct organization as to be considered by zoologists the type of a particular group; but the characters of the groups have been very imperfectly described. They each have a very peculiar conformation of the head and skull; these peculiarities have not yet been used by zoologists in the manner which they deserve.

The Turtles or *Oiacopodes*, though they have a general external resemblance, may be divided into two very distinct series.

Several species are described, and said to be figured by Mr. Girard in the 'Herp. Expl. Exped.' of Wilkes; but our copy of that work does not contain the plates, and the descriptions are very difficult to understand*.

* In reply to an inquiry about the imperfections in our copy of this work to Prof. S. F. Baird, he states, "I have made an examination of our copy of the plates of the Herpetology of the Exploring Expedition, and find it contains the full number of thirty-two plates, corresponding to the explanations of the plates. The Government edition of this work, and that which you have in the British Museum, embraced only twenty-three plates, the additional ones having been prepared at Mr. Girard's expense for the extra copies.

"Should you desire this work, you can obtain it without any difficulty from Messrs. J. B. Lippincott & Co. of Philadelphia, who published the book and still have it on sale."—April 5th, 1873.

P.S. (July 15th).—The Society having lately received the Atlas of the 'Herpetology of the U. S. E. E.' with 32 plates, I send the following notes on the plates:—

1. Pl. 29. *Thalassochelys corticata* is *Caouana caretta*.
 2. Pl. 30. f. 1-7. *Caretta squamosa*. Sooloo Seas.
 3. Pl. 30. f. 8-13. *Caretta rostrata*. Fiji Islands.
- These two species are unknown to me; but they are said to have imbricate shields, and therefore cannot be *Onychochelys kraussii*.
4. Pl. 31. f. 5-7. *Chelonia marmorata* (not *Euchelys macropus*, as marked in the plate).

- I. THE TURTLES: *with the bones of the vertebræ and ribs expanded and forming in the adult state a complete bony disk, the bones of the sternum separate, but united by dentated sutures into a disk, and edged with a series of marginal bones.*

Both the back, margin, and sternum are covered with more or less thick, regular, symmetrical, horny plates, as in most other *Chelonians*.

The head is covered with symmetrical shields; and the nostrils are in the front, just over the upper edge of the upper beak, which has a more or less deep notch for their reception.

This group contains two very distinct families.

Fam. 1. CHELONIADÆ, Gray, Hand-list Tort. p. 92.

The head covered with few, regular, symmetrical shields, and with only one superorbital shield on each side, and two shields on each side of the occiput. The beaks horny, the upper one occupying more than half of the lateral margin, with a sharp dilated margin. The lower jaw fitting into the upper, the lower beak being short, and truncated behind, on a level with the central suture or gonyx, and covered with a large elongate horny plate on each side.

The head has in the central line two nasals, a frontal, a parietal, and two occipital plates. Two temporal plates. The cheeks are covered with several plates, three or four forming the back edge of the orbit, the front upper part of which is covered by the outer edge of the nasals.

The tympanic cavity in the skull is surrounded by a large smooth concavity, defined by the surface of the temporal bone.

The hinder central bone of the dorsal disk, even in the young specimens, reaches to the front edge of the hinder central marginal or caudal bone.

Tribe 1. CARETTINA, Gray, *l. c.* p. 92.

The head produced, compressed, and narrow in front. The lower jaw smooth, even on the edge, and covered with the beak on the outside, and only slightly fitting into the upper beak, which is smooth on its inner surface. The alveolar surface of the upper beak and of the skull beneath it with a broad diverging ridge on the middle of each side, which is separated in the front by a longitudinal groove; that of the lower beak and jaw deeply concave, with

5. Pl. 31. f. 8. *Chelonia tenuis*.

The figures of these two species do not afford me the means of determining what species they belong to; but they are certainly not what I have described as new.

6. Pl. 31. f. 9-11. *Euchelys macropus*, Philippine Islands, is a young *Chelonia*, very likely the young of *C. mydas* or *C. marmorata*. It is not named on the plate.

7. Pl. 32. *Actinemys marmorata*, young and adult. Puget's Sound, Oregon, and Sacramento.

This species is very different from the *Emys nigra* of Hallowell, quoted as a synonym in the text, and is evidently a redescription of my *Emys olivacea*.

a ridge near its hinder margin, having a longitudinal keel across the hinder half of the concave surface.

The palate behind the nostrils in the skull is rather concave, and diverges behind into a groove, produced by the elevated margin of the basioccipital and basisphenoid bone.

1. CARETTA.

1. CARETTA IMBRICATA, Gray, Cat. Tort. p. 74.

The outer side of the head showing the shields and the upper part of the skull is figured by Temminck in the 'Fauna Japonica,' t. v. & vi. The band of shields at the back edge of the orbit contains three, one being below between the other two and the back margin of the jaw. Temminck's figure of the head of *C. imbricata* in the 'Fauna Japonica,' t. v. f. 1, does not give a correct idea of the shields of the head as they usually are; the frontal and parietal plates are united into one, and the soft naked space between the nostrils and the frontal plate is figured to represent a pair of plates.

In a skeleton of this genus in the British Museum, with the dorsal shield 7 in. long, the hinder central bone of the dorsal disk is expanded, ovate-lanceolate, rather contracted before, then slightly dilated, and gradually narrowed behind for more than half its length, when it reaches the front edge of the hinder marginal bones. It is keeled on the back as on the vertebral plates. The front of the two hinder central bones is band-like, nearly as broad as the dilatation of the last rib, and narrower in front.

In a second skeleton in the British Museum, with the dorsal shell $10\frac{3}{4}$ in. long, the last bone is rather broader and more ovate.

2. ONYCHOCHELYS, Gray, Hand-list, p. 93.

The beak and shields of the head like those of *Caretta imbricata*, but the occipital shields larger and longer, the beak more compressed, and the end produced and bent down in the centre. Dorsal shields covered with simple, thin, flat, not thick, imbricate plates. Costal shields 4. 4. Front fin with a very large claw to the first, and a small claw to the second finger. The front lateral sternal bones with one acute lobe on the left side, and two acute lobes on the right side of the inner edge directed straight across; hinder lateral bones with three or four acute diverging lobes on the inner edge, the hinder lobes being rather directed backwards; the styliform process of the front odd bone elongate or slender.

This genus is very like *Caretta*; but the upper beak is larger and bent down at the end in front, and not truncated as in *Caretta*; and the lower beak is also larger and stronger, and the lateral shields on the side of the lower jaw not quite so large. All the plates on the dorsal shield are thin, and not at all produced on the hinder edge. The front vertebral plate is very broad and triangular, much broader than long, and slightly truncated at the front lateral edges; the second, third, and fourth vertebral plates are hexagonal, contracted on the hinder lateral edges; the hinder vertebral plate is elongate

triangular, truncated in front, and slightly notched behind in the centre. The hinder pair of caudal plates are very long, much longer than broad, four-sided, the hinder and outer sides shortest; and the hindermost lateral plate has a straight inner edge, and is not angular and produced as in *Eremonia elongata*.

The dorsal shield of this genus has some resemblance to the shield of *Eremonia elongata* in the large size of the caudal marginal plates; but of the latter genus the head and limbs are unknown: it belongs probably to the family *Cuouanidæ*, as it has five costal shields on each side; while this has only four, and belongs to *Cheloniadæ*. The shields of the two genera may be thus distinguished:—

Onychochelys.

Costal plates 4 . 4.

First vertebral shield triangular, with lateral angles truncated, much longer than broad.

Second, third, and fourth vertebral shields hexagonal; lateral angles produced, as broad as long.

The penultimate marginal shield with a straight inner edge.

Eremonia.

Costal plates 5 . 5.

First vertebral shield hexagonal, as broad as long.

Second, third, and fourth vertebral shields very long, oblong, four-sided, with the middle of the sides rather prominent, much longer than broad.

The penultimate marginal shield prominent, angular in the middle, projecting between the last costal and the last vertebral shields.

1. *ONYCHOCHELYS KRAUSSI*, Gray, Hand-list, p. 93. (Fig. 1, skull; fig. 2, animal.)

Chelonia marmorata, Krauss, not Duméril and Bibron.

Hab. Ocean, French Guiana (*Krauss*).

The palate deeply concave, with a deep well-marked groove on each side of the basioccipital bone, which has a very strong ridge on its front lateral margin. The alveolar surface of the upper beak with a very high arched ridge, which is much the highest in front, and very rugose on its edge and on the hinder part of its surface, having an obscure indication of a ridge parallel to its hinder margin, and then shelving down to the inner nostrils. The alveolar surface of the lower beak concave, very wide in front, narrow on the sides, becoming narrower behind, and with a sharp elevated ridge on the inner margin. There is a longitudinal central ridge across the hinder half of the concavity of the lower alveolar edge. The concavity of the alveolar of the lower jaw fits on to the ridge in the upper jaw. The inner surface of the beak within the hinder ridge is yellow and horny like the outer surface. It is broad and high in front, gradually narrowing on the sides; the surface is smooth, with a groove on each side in the middle of the front; and the sides have close parallel grooves ending in crenations on the margin of the ridge.

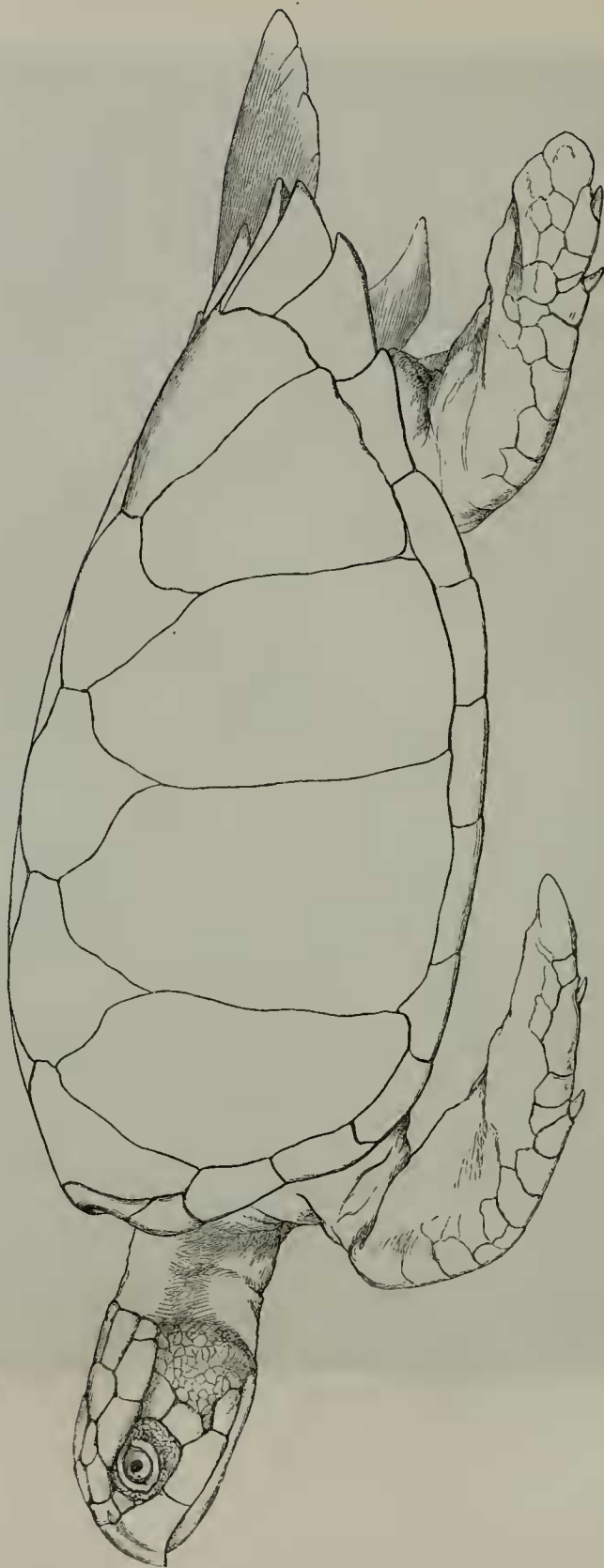
The specimen in the British Museum is full-grown, and has the dorsal shell 35 in. long, and 31 in. broad in the widest part over the

Fig. 1.



Skull of *Onychochelys kraussi*.

Fig. 2.

*Onychochelys kraussi.*

curve. The horny plates are thin, smooth, worn, and are studded with different-sized Turtle-barnacles (*Chelonobia*), and also with a large number of common barnacles, especially on the sides of the back, leaving the middle of the dorsal plates bare.

The specimen here described was sent to me by Dr. Krauss from Stuttgart, as *Chelonia marmorata* of Duméril and Bibron (Erp. Gén. ii. p. 346, t. xxiii. f. 1); but it cannot be that species, for they say, "Sous le rapport de la forme, cette espèce ne diffère pas de la précédente (*C. maculosa*), elle s'en distingue seulement par son système de coloration." He figures the head-shields (t. xxiii. fig. 1 a) as like those of *C. mydas*, and very different from the head-shields of *C. imbricata* on the same plate (fig. 2 b), which these are like.

I may here remark that their figure of the beak of *C. imbricata* is so incorrect as to represent this species rather than the true *C. imbricata*, which is the one that their figure of the back represents.

Dr. Krauss has kindly sent me the head of a rather larger specimen of this Turtle, which enables me to describe the alveolar surface of the jaws, which is very different from that of any known Turtle, and confirms the genus. This head has the shields rather different from the specimen originally described; and as the shields on the two sides of the head are not regular and similar, we may consider them abnormal. There is a narrow strap-shaped shield on the left side and parallel to the outer margin of the large central hinder plate; but this shield is separate on the hinder half, and united to the central shield on the front half of the right side of that shield. In the same manner the large temporal shield just beside the supraoccipital shield is divided into three shields on the left side, and into two shields on the right side of the head; and the upper shield is longer on the right side than it is on the left: but it is easy for any one to see that these do not alter the character.

Tribe 2. CHELONINA.

The head is oblong and rounded in front. The lower jaw is strongly dentated on the outer edge, and, except just in front, is strongly striated on the outer surface, and fits into the very high sharp margin of the upper beak, which is also deeply and regularly grooved on its inner margin. The alveolar surface of the upper beak and of the skull beneath it with a narrow diverging ridge on each side nearer the outer than the inner margin, separated by a longitudinal groove in the centre, and with a linear raised granular ridge margining the hinder edge of the alveolar surface. The alveolar surface of the lower beak and jaw with a strongly dentated edge, and a deep triangular concavity within it, divided in half by a central longitudinal ridge, and with a sharp ridge parallel to but some little distance from the hinder margin, the acute ridge and flat hinder space being granular. The horny part of the lower beak triangular, only covering the front end of the jaw. The horny plate on each side large, narrow, and only covering the front two thirds of the narrow prominent lower part of the jaw. The band of

shields at the back edge of the orbit consisting of four or five shields, one at the lower part of the orbit between the other shields and the margin of the jaw. They seem to vary in number, as in one specimen there are four on one side and five on the other; but I believe four is the usual number. The skull is not so broad compared with its length as that of the Loggerhead (*Caouana*).

1. CHELONIA.

Temminck represents the side and top of the head and the side and top of the skull of *Chelonia viridis* (Fauna Japonica, t. iv. & vi.).

The sternum is well figured by Cuvier (Oss. Foss. t. xiii. f. 6).

The generality of specimens in the British Museum have the hinder part of the base of the skull nearly flat; but there is one skull of a half-grown Turtle which has this part keeled in the middle, and there is a concavity on each side of the middle, and diverging on each side of the triangular prominent basisphenoid bone. This may be the character of one of the species; but I have not the specimen to which the skull belongs, and therefore cannot name it with certainty. There is another small specimen which seems to have this character not quite so much developed; but it is also the odd skull of a Turtle that was "dressed" in 1811, and weighed 66 lbs.

I think both these skulls are rather narrower compared with their length than the other skulls, which have this part more flattened.

In a dorsal shield of a skeleton of *Chelonia viridis* in the British Museum, 34 in. long, the hinder of the two odd bones placed beyond and attached to the hinder edge of the dilated part of the last pair of ribs is nearly semilunar, about half as long as broad, with a projecting rounded hinder edge, very short, and band-like on the lateral margin, which is nearly as broad as the back edge of the dilatation of the last or eighth pair of ribs. The front margin is concave. The last odd bone is triangular, as broad as long, with a broad semicircular front edge, and is contracted on the sides in front at the hinder part, and is attached by its tip to the front edge of the two hinder marginal bones. In the older specimens, when the dilatations of the ribs reach the marginal bones, these odd bones do so at the same time, and thus lose their characteristic form.

In one specimen with the dorsal shield $4\frac{3}{4}$ in. long, which has three straight rays on one side and four on the other, the front odd bone between the last ribs is rhombic, longer than broad, narrower in front; and the second bone is elongate-lanceolate, narrow in front and behind, not reaching the inside of the hinder marginal bone.

1. CHELONIA VIRIDIS.

2. CHELONIA VIRGATA.

There appears, by the colouring of the dorsal disk, to be two species of true herbivorous Turtle, *C. viridis* and *C. virgata*, Cuv.; and I formerly thought that I had discovered an organic character in the form of the last two central vertebral plates between the

hinder edges of the last pair of ribs : but the re-examination of a larger set of specimens of different ages makes me doubt the importance of the characters assigned to them ; for I cannot find, in a very large series of specimens, any character but such as is altered with age, and seems common to the whole group, either in the form of the skull or form and development of the bones of the disk. Though the middle-aged specimens are differently coloured, as if indicating two species, all the very young specimens are very much alike, as if they belonged to one species.

It is the same with the form and development of the shell and of the dorsal and sternal disks, which are all liable to slight and apparently unimportant variations ; and evidently, from the dorsal shells we have received, the animals of which have been cooked, the green and rayed Turtles are both eaten.

At the same time it should be recollected that museum zoologists labour under great disadvantages ; and if the two species or varieties could be examined alive and their skeletons compared, a character might still be found to distinguish them.

Fam. 2. CAOUANIDÆ.

The head broad, covered with regular symmetrical shields, with three or four pairs of shields over the orbit, and two shields on each side of the occiput. The beaks large and horny, the lower one just fitting into the edge of the upper, the upper and lower beaks occupying the greater part of the lateral margin of the jaws ; the hook of the lower beak fitting into a pit in the alveolar surface of the upper one ; the lower beak covering the greater part of the lower jaw, which has small scales on the hinder part of the sides.

Tribe 1. CAOUANINÆ.

The jaws strong. Costal shields five on each side, the front shield small and thin ; hinder ones broad, as broad as two marginal shields. The nuchal shield very broad, as broad as the first vertebral. The alveolar surface of the upper beak and skull beneath it smooth, with a deep pit in front for the acute point of the lower beak and lower jaw. The base of the skull of *Caouana* is nearly flat, with a narrow groove behind diverging at each side of the front edge of the rather prominent triangular basisphenoid bone. The tympanic cavity has a smooth naked space in front of it, which is flat, and not concave as in the *Cheloniadæ*. In *Caouana* the front pair of sternal bones is narrow, and the front odd bone is lanceolate, rather broad. The inner edge of the front and hinder pairs of lateral bones has many radiating acute processes. The radiating processes on the inner side of the front pair are directed forwards, and those of the hinder pair are directed backwards. The two central bones between the hinder edges of the last pair of ribs are thick and keeled externally, comparatively short in the young specimens, and do not reach the hinder margin of the caudal marginal bones. The costal and vertebral shields of the young are

strongly keeled; but the keels of the costal plates soon entirely disappear, and those of the vertebral plates remain for the greater part of the life of the animal. The vertebral plates are as broad as long, or broader in the young specimens; but they increase in length as compared with their breadth as the animal grows older.

1. CAOUANA.

The superocular plates are three on each side, the front one being the longest, and meeting the plate on the opposite side in front. The two hinder broader than long, with three shields on the back edge of the orbit, the lower one being the largest. The head-plates are very variable: there is generally a plate behind the suture of the occipitals; sometimes it is placed between the pair; sometimes these plates are moderate, at others very small. The frontal plate varies greatly in size. The parietal plate is generally large and simple; but in one specimen in the British Museum it is divided into two equal plates by a central longitudinal suture.

The skull of this genus is figured in Cuvier, *Oss. Foss.* v. t. ii. f. 1-4.

The shields of the head figured by Temminck in the 'Fauna Japonica' under the name of *C. cephalo*, t. iv. f. 1-3, probably belonging to this genus; but it has a very large central occipital, which is certainly not the normal form of the species which has come under my observation.

1. CAOUANA CARETTA.

The sternum of *Caouana* is figured by Cuvier (*Oss. Foss.* t. xiii. f. 7), but with too few hinder lateral lobes, and by Prof. Owen (*Phil. Trans.* 1849, p. 153, f. 3) with too many anterior and posterior lateral lobes.

A skeleton of *Caouana* in the British Museum, with the dorsal shield 17 in. long (the dilatation of the ribs being only extended for about two thirds the length of these bones), has the first of the two odd bones between the hinder pair of ribs consolidated with the rest of the disk; but Prof. Owen, in a specimen apparently about the same size, represents (f. 1, s 10) this bone as band-like, about half as broad again as long, and six-sided. The Museum specimen has an oblong elongate last bone, nearly twice as long as broad, rather broader in front than behind, and slightly constricted a little in front of the hinder margin. It is very thick, strongly keeled on the upperside, with a rounded tubercle at the end of the keel. It does not reach the hinder edge of the two hinder marginal bones.

This bone is well seen in the younger specimens of the complete animal, and forms a prominence at the end of the dorsal keel; but I believe it dilates on the sides, as the sides of the ribs dilate in the older specimens, so as to form with the ribs and margin a solid continuous shield. The bone is not well represented in Prof. Owen's diagram.

In a young specimen 9 in. long, the front odd hinder bone is

rhombic, rather broader than long, and the second one is ovate, linear, three times as long as broad. This bone does not nearly reach the front edge of the caudal marginal bone, nor does it do so in much larger specimens (as, for instance, the skeleton in the Museum), while it does in specimens of *Chelonia* in a less-developed state.

In a specimen in the Museum, 8 in. long, the front odd bone has become much broader and band-like, and the hinder bone broader, becoming gradually narrower in front, assuming an elongate triangular shape, and reaching the edge of the caudal plates; and it appears to grow wider as this angle increases in size, having rather concave sides in the younger specimens.

I formerly thought that the shape of this bone would distinguish the two presumed species; but the examination of a large number of specimens of all sizes and ages makes me have less faith in the character for even separating the younger specimens.

MM. Duméril and Bibron, in the 'Érptologie Générale,' vol. i. p. 25, t. ii., give a representation of the skeleton, which they call "Chélonée Caouane," which either does not represent this species or is very incorrect. Indeed I do not know from what species it could have been taken. Can it be from a specimen made up of bones of several species? The head is much slenderer than that of *C. caouana*; it is slender and acute in front, like that of *Chelonia imbricata*. The ribs are only dilated about two thirds of the length, showing that it is from a young specimen; yet the two hinder central bones between the last pair of ribs and the margin are broad, dilated and oblong, and united to the front edge of the hinder marginal bones, very unlike these bones in a young Loggerhead, where they are oblong, longitudinal, thick, and do not reach the marginal bones.

Professor Owen, in his 'Monograph of the Fossil Reptilia of the London Clay,' gives the figures of the bones in a front and back view of the dorsal shield of this species and the sternum (pp. 3, 4, f. 1-3). As is his custom, he gives the name of *entosternal* to the front median piece, *episternal* to the anterior pair of sternal bones, *hyosternal* to the second, *hyposternal* to the third, and to the posterior pair *xiphisternal* (p. 4); and Professor Huxley, in his 'Manual of Anatomy,' p. 202, f. 64, changes the names of these bones to *interclavicle*, *clavicles*, *hypoplastron*, and *xiphiplastron*.

Chelonia subcarinata of Owen's 'Fossil Reptilia of the London Clay,' t. viii., seems nearly allied to this genus; but I should doubt several of the fossils (as *C. breviceps* and *C. longiceps*) belonging to it; at least, if they are marine Turtles, they belong to a group quite distinct from any of the existing forms.

Tribe 2. LEPIDOCHELYINA.

The jaws very strong, the lower one very acute and strongly bent up in front. Costal shields seven on each side; the first smallest, the fourth, fifth, sixth, and seventh very narrow. The nuchal shield as wide as the first vertebral. The alveolar surface of the upper beak

and skull beneath it with a triangular ridge on each side, divided in front by a central longitudinal groove; of the lower jaw concave, with a sharp edge on the outer and inner margin. Claw of the first finger moderate.

1. LEPIDOCHELYS.

Head not so broad as long; sides flat, angularly contracted in front. Dorsal shield keeled, the nuchal plate very broad, the first vertebral broader than long, the second and third much longer than broad; front fin with one small claw on the outer side. The nasal shields broader than long, the frontal plate elongate, six-sided, the parietal plate subtriangular, broader behind, covered in front by the hinder part of the frontal plate, many-angular on the sides, and with an arched-out hinder margin. Occipital shield single, transverse, large, rounded in front, truncated behind. Superoocular shields three on each side; the front one square, united with the opposite one in front of the frontal; the middle one largest, rather longer than broad; and the third smallest, broader than long. The cheeks with a series of four shields, the upper being small and square. Upper beak with a slight central hook; the alveolar surface with a ridge on each side, interrupted in the middle, rather closer to the inner edge than the outer one. Inner edge with a blunt raised margin. The alveolar surface of the lower jaw deeply concave, with a high acute ridge on the front and hinder margins, and a well-marked central longitudinal ridge across the concavity in front, which is more acute and higher behind, and with a broad deeply concave space behind the inner ridge.

The upper alveolar surface of the beak of this species is very like that of *Cephalochelys*; but the lateral ridge on each side is nearer the hinder margin, and the surface behind it is not only margined on the edge, but is much narrower. In some respects the upper alveolar surface is more allied to that of *Chelonia*; but the lateral ridges are much further from the outer margin, and the alveolar surface of the lower beak is narrower, with a more decided central longitudinal ridge, and a much wider concave surface within the ridge; and the beak itself is not nearly so high and strong.

The sternum is callous on the three pairs of lateral bones, leaving a longitudinal soft space in the middle. The front pair of bones, which are short and V-shaped, and the broad lanceolate odd bone, which is broad and angular in front and produced and tapering behind, about once and a half as long as broad, are only covered with a soft skin, which is transparent.

The hinder vertebral bone in this adult specimen is broad, the whole width of the two posterior marginal plates.

There can be no doubt that it is quite a different genus from the common Loggerhead (*Caouana*), not only in the form of the last vertebral bone, but also in the shape of the shields of the head.

The number of the costal shields is increased by what are usually considered the fourth and fifth being divided in half, so that there is a distinct shield over each of the hinder ribs, instead of one to

each pair of ribs. I thought at first that this might be an individual peculiarity; but it appears common to the group; for it is equally well marked in a nearly adult shell, in a younger one about two thirds the length of the former, and in a very young one five inches long.

The dorsal shield of this genus is very thin, more like a thin, hard, semitransparent skin than the horny plates usually called tortoise- or turtle-shell; and it allows the sutures of the bone to be seen through it.

Fitzinger, in his 'Systema Reptilium,' p. 30, gives two generic names to this species, *Lepidochelys olivacea* and *Thalassochelys olivacea*. As I wanted a generic name, I have employed the first name, and given it a proper character; but I have no doubt that it will be quoted as Fitzinger's genus, although his character is not taken from nature.

This genus differs from the genera *Caouana*, *Caretta*, and *Chelonia* in the number of head-shields that it possesses.

1. LEPIDOCHELYS OLIVACEA, Gray, Hand-list Tort. p. 91.

There is a nearly adult animal and shell of this species in the British Museum. There is also a dorsal shell of a specimen nearly adult, but only 18 inches long, from Cape York, which has elongated vertebral plates like the former specimen. This specimen is peculiar for having six vertebral shields; but the three hinder are very short, the first and sixth being much shorter than broad, and the fifth about as broad as long. They appear to be merely a malformation of the fourth and fifth shields in the more adult specimens.

The keel is compressed and very high on the hinder half of the first and second, and only slightly marked on the hinder part of the third, and on the hinder and front part of the fourth and fifth vertebral shields, the position of the two lateral plates being caused by the unusual division of these plates. The hinder or caudal shields are very large, long and square, approaching to what they are in the genus *Eremonia*.

There is also in the British Museum a young specimen of the genus from the Philippine Islands which appears to belong to the species; the back is three-keeled, the keel of the vertebral plates, which are broader than long, being the highest; it has seven costal shields on each side. The sternum is bluntly keeled on each side. The lower beak is rather shorter than in the adult specimen in the British Museum, and it has a narrower elongate plate on each side behind it; but this plate is very unlike the large elongate oblong shield on the side of the jaw of *Chelonia*.

The beak of the lower jaw appears to be smaller than in the adult animal; and in this respect it is something like the genus *Caouana*, which has the lower beak smaller compared with that of the adult *Lepidochelys*.

In this specimen there is a small square shield interjected between the fourth and fifth vertebral shields.

2. CEPHALOCHELYS.

Head large. Beak very large and strong, with a deep notch on the centre of the margin of the upper edge for the nostrils. Nasal shields very short, broader than long; the frontal plate elongate, narrow in front; parietal shields moderate, broader than long, many-sided; occipital shields two, large, with some small scales at the hinder part of the central suture. Four superocular shields on each side; the two front square, rather longer than broad; the two hinder larger, broader than long. The cheeks with a series of four shields on the hinder edge of the orbit, the upper one being the smallest and shortest. The temples with three large shields and some small ones.

The alveolar surface of the upper beak with a large diverging ridge on the middle of each side, which is much broader in front (and these are separated from each other by a longitudinal groove), with a pit quite in front of it, for the reception of the hook of the lower jaw, and with a very broad, nearly flat surface behind it. The alveolar surface of the lower beak very deeply concave, with a very sharp high outer edge, and a high acute edge on the inner side, with a central longitudinal prominence crossing the hinder half of the alveolar concavity.

The pectoral fins with a large strong claw at the end of the front finger.

1. CEPHALOCHELYS OCEANICA, Gray, Hand-list Tort. p. 91.

Unfortunately the British Museum only possesses the head, neck, and fore fins of this Turtle, which was purchased of a dealer, who said it came from the West Coast of America—he believed, Mexico; so that I cannot describe the rest of the animal, and especially the bones of the back and sternum and the plates with which they are covered. The size of the beak and the shields of the head leave no doubt that it is distinct.

3. ? EREMONIA.

Head and fins unknown.

Shell elongate, contracted behind, marginal plates seventeen. Two caudal marginal plates very large, square, much longer than broad. Thorax convex on the sides. Vertebral shields in the adult much longer than broad, slightly six-sided, scarcely keeled; the last very large, as broad as long.

1. EREMONIA ELONGATA, Gray, Hand-list Tort. p. 96. (Fig. 3, dorsal disk.)

Caouana elongata, Gray, Cat. Tort. &c. B. M. 1840, p. 53; Cat. Sh. Rep. p. 73.

Hab. Ocean.

The shell of this animal has been in the Museum for more than forty years; and, though frequently searched for amongst dealers and in museums both British and Continental, I have never been able to

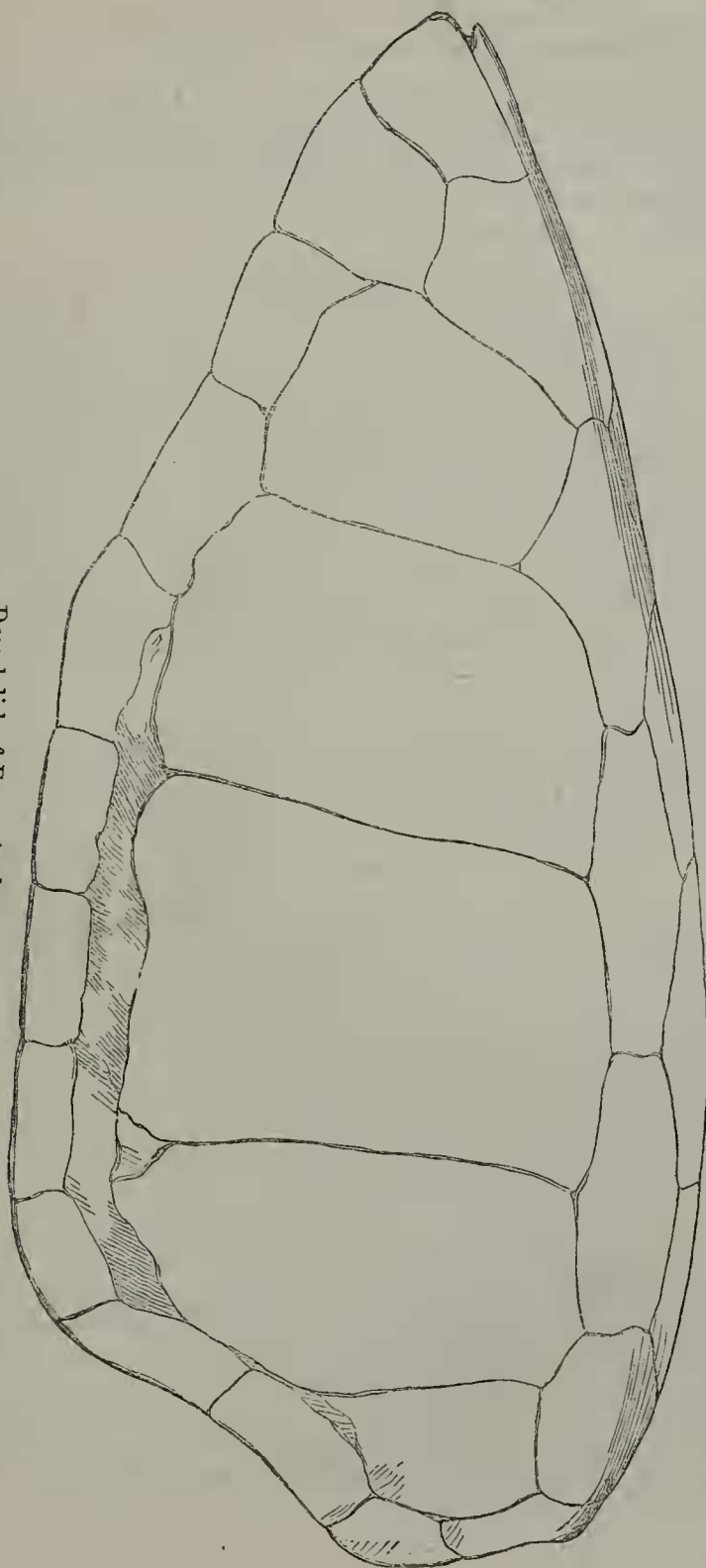
Dorsal disk of *Eremonia elongata*.

Fig. 3.

find a second specimen, much less one with the animal; and therefore I have ventured to form a genus for its reception.

- II. THE LUTHS (Sphargididæ) *which have the vertebræ and ribs separate both in the young and adult state, as in the generality of vertebrated animals. The bones of the sternum very slightly developed, and only forming an imperfect marginal ring, being destitute of any marginal bones.*

Family I. SPHARGIDIDÆ.

The outer case of the animal, which has the external appearance of the bony case of a Turtle, is formed of very thick skin studded with close polygonal tubercles, and strengthened with longitudinal ribs supported by larger oval tubercles, which form prominences on the ridges of the back, and especially on the tail of the animal.

The head, unlike those of other Turtles, is covered with a soft skin, and is much rounded in front; the nostrils are small, and high up, on a level with the eye; the upper jaw notched on each side; and the lower jaw, which is weak, is furnished with a conical prominence in front, fitting into a hole in the palate of the upper jaw. The nasal hole in the skull is high up from the lower lip, and separated from it a considerable distance by the high large intermaxillary bone, which is large, but not so large, in *Caouana* or *Lepidochelys*.

The sternum of the very young animal is figured in the 'Annals and Magazine of Natural History,' 1873, t. vi. f. 5. The fore fins are very long, and the finger-bones of the fore and hind fins are rather more regular in length than in other Turtles.

1. SPHARGIS.

The adult skull (t. ii. f. 1 & 2) and other parts of the osteology of this species are figured by Temminck in the 'Fauna Japonica,' t. ii. & iii. The animal from life, and a front view of its head, are figured in t. i. & v. of the same book. I have figured the skull of the young in the 'Suppl. Cat. Sh. Rep.' p. 119, f. 40; and Wagler in the 'N. Syst. Amphib.' t. i. f. 5, 6, & 10-13.

Dr. Wagler, in his 'Nat. Syst. Amphib.' t. i. f. 1-23, figures the osteology of a newly hatched specimen, showing that the ribs are slender and free for their whole length, and the sternum formed of very slender rudimentary bones, which are divided into a front and a posterior group.

In my paper on the development of the sternum of Tortoises, in the 'Annals and Magazine of Natural History' for March 1873, I described and figured the sternum of a newly hatched specimen; and I described the vertebral ribs and sternum, as seen on the inside of the skin, of an adult specimen from the Cape, showing that the ribs and sternal bones of the adult are not dilated as in other Chelonians.

The skeleton of the adult in the Museum of Stuttgart, Dr. Krauss informs me, was extracted from a specimen sent in spirits from Suri-

nam, the skin of which is also exhibited, stuffed, in the Museum. Dr. Krauss intends shortly to describe and figure the skeleton*.

1. SPHARGIS CORIACEA, Gray, Cat. Tort. p. 71.

A specimen of this species has this month (February 1873) been taken on the coast of Yorkshire; but I fear it has been so cut up that it will not make a skeleton.

3. On a Scaup Duck found in China. By ROBERT SWINHOE, F.Z.S., H.B.M. Consul, Ningpo.

[Received March 1, 1873.]

Two brown Scaup Ducks were brought to me alive the other day (21st October 1872) by a fisherman, who said he had taken them, along with several others of the same kind, in his fishing-nets, out of very large flocks, off the mouth of our river. From the mottling of their backs it was easy to see that they belonged to the Scaup group; but they were too small for the true *Fulix marila*, which I had before procured at Anoy.

I looked at Yarrell's 'British Birds,' and Baird's 'Report of Explorations and Survey' &c., part 2. Birds, and made them out to be the *Fulix affinis* (Eyton), or American Scaup. I got the fisherman to bring me the remaining birds, and picked out five more from this dead lot, which gave me three adult males and one adult female.

They all agreed in smallness of size and main characters, which showed them to be of the same species. One peculiarity, however, I noticed in them, which neither Yarrell nor Baird mentions; and that is "*the white on the primaries of the wings.*" As *Fulix marila* and *F. affinis* are said to have similar wings, I thought the omission of this was accidental; and I was confirmed in this view by turning to M'Gillivray's 'British Birds' (vol. v. p. 118), and reading that *F. marila* has the primaries partly greyish brown, but *from the fourth primary to the tenth secondary is a broad white band*, including the whole length of three quills except the tips; and I concluded therefore that I had got *F. affinis*, and that its occurrence here showed that, as in the case of *Ædemia americana* and *Larus occidentalis*, American sea-birds of the Pacific side often visit Eastern Asia. But a reference to Schlegel ('Muséum des Pays-Bas') upset my speculations. Schlegel points to the less white on the primaries in *F. affinis* as one of the chief distinctions between it and *F. marila*. In his own words (*op. cit. Anseres*, p. 28), "*au blanc des rémiges primaires n'atteignant pas le bord postérieur des secondaires.*" Our bird, then, is not the American *F. affinis*; but it nevertheless must be the bird

* The specimen at Stuttgart measures in a straight line from the end of the skull to the tip of the tail 187 centims.; the skull is 25 centims. long, and 21·5 centims. broad. (See Ann. & Mag. Nat. Hist. 1873, xii. p. 77.)

M. Gervais has published a paper on the skeleton of a young animal of this genus in the Nouv. Arch. du Muséum, and has described a fossil species, *Sphargis pseudostracion*. (See Ann. & Mag. Nat. Hist. 1873, xi. p. 471.)